

The Effectiveness of Dysmenorrhea Exercise Intervention in Reducing Menstrual Pain Among Adolescent Girls

Emi Kusumawardani^{1*}, Puput Safitri²

¹Bachelor of Midwifery Program, STIKES Husada, Jombang, Indonesia

²Bachelor of Nutrition, STIKES Husada, Jombang, Indonesia

ABSTRACT

Introduction: Dysmenorrhea is characterized by severe menstrual cramps and increased myometrial contractility, which is triggered by elevated prostaglandin synthesis. This response results from heightened sensitivity of the uterine muscles to prostaglandins, leading to uterine hypoxia and ischemia, and ultimately causing pain. Dysmenorrhea affects approximately 70% to 90% of women under the age of 24. One of the non-pharmacological approaches to relieve this pain is physical exercise or targeted movement therapy. This study aimed to evaluate the effectiveness of dysmenorrhea exercise intervention in reducing menstrual pain among adolescent girls. **Materials and Methods:** This study employed an experimental design using a one-group posttest-only approach. The population consisted of 124 female adolescents from Muhammadiyah Jogoroto Islamic Junior and Vocational High Schools. A total of 60 respondents who experienced menstrual pain were selected using a purposive sampling technique. Data were collected through questionnaires and analyzed using a t-test. **Results and Discussion:** The findings indicated that the mean rank of respondents before participating in the dysmenorrhea exercise intervention was 21.52, while the mean rank after the exercise was 23.24. Statistical analysis showed a significant difference in the degree of dysmenorrhea before and after the intervention, with a *p*-value of 0.0001, which is less than the significance level $\alpha = 0.05$. **Conclusion:** This study demonstrates that dysmenorrhea exercise intervention has a significant effect on reducing dysmenorrhea among adolescent girls.

Keywords: Dysmenorrhea, exercise intervention, menstrual pain, adolescent



INTRODUCTION

Dysmenorrhea is a common gynecological condition originating from the uterus and characterized by severe menstrual cramps. It is classified into primary and secondary dysmenorrhea, with primary dysmenorrhea referring to menstrual pain that occurs in the absence of any identifiable pelvic pathology. Elevated endometrial prostaglandins (PGF₂ α and PGE₂) and their metabolites are considered the primary contributors to these symptoms (Itani et al., 2022). The increased synthesis of prostaglandins,

which enhances uterine muscle sensitivity, leads to heightened myometrial contractility. This, in turn, exposes the uterus to hypoxia and ischemia, ultimately resulting in pain (Bilir et al., 2020).

Affecting over 50% of menstruating women, primary dysmenorrhea represents both a clinical and social concern (Esan et al., 2024). The pain typically begins within the first 24–36 hours of the menstrual cycle and may persist for two to three days. It most commonly manifests during the early years of menstruation (Ferries Rowe et al., 2020). Globally, the reported prevalence of dysmenorrhea

ARTICLE HISTORY

Received: 15 June 2025

Revised: 27 June 2025

Accepted: 28 June 2025

*CORRESPONDING AUTHOR

Email: emikusumawardani80@gmail.com

Bachelor of Midwifery Program, STIKES Husada, Jombang, Indonesia

is significantly influenced by various sociocultural factors. Between 45% and 95% of women of reproductive age report experiencing dysmenorrhea, with 2% to 29% suffering from severe pain. Among women under the age of 24, prevalence rates range from 70% to 90% (Itani et al., 2022).

Several factors contribute to the onset of dysmenorrhea, including age, alcohol consumption, family history, low body mass index, menstrual flow characteristics, anxiety, chronic pelvic pain, and duration of menstruation. Lifestyle patterns, interpersonal relationships, and overall quality of life are significantly impacted by dysmenorrhea. These effects are dependent on the severity of perceived pain. Additional consequences include sleep disturbances, social withdrawal, decreased personal activity, and limitations in daily functioning (Benson-Thomas et al., 2025).

For over three decades, regular physical activity has been recognized as beneficial in the prevention and management of dysmenorrhea (Shahnaz and Hosseini, 2010). Several theories advocate for mild to moderate exercise as a method to alleviate dysmenorrhea. Physical exercise promotes the release of endorphins, which are naturally occurring neurochemicals produced by the brain and spinal cord. These hormones act as natural analgesics, contributing to a sense of well-being (Harry, 2025). Exercise may also delay the accumulation of prostaglandins and accelerate the removal of metabolic waste products. It helps reduce menstrual

pain by increasing endorphin levels, lowering stress and sympathetic nervous system activity, and enhancing pelvic blood flow (Shahnaz and Hosseini, 2010).

MATERIALS AND METHODS

Based on its objective, this study employed an experimental design. The population consisted of 124 female students, with a sample of 60 students from Muhammadiyah Jogoroto Islamic Junior School (MTS) and Vocational High Schools (SMK) who experienced menstrual pain. Purposive sampling was used to select participants. The variables examined included dysmenorrhea pain after treatment (dysmenorrhea exercise intervention). Post-treatment observations were conducted, and data were collected using questionnaires and analyzed using a t-test.

RESULTS

The following are the research results based on menarche groups among students at MTS and SMK Muhammadiyah Jogoroto ([table 1](#)). Based on [table 1](#), it can be seen that out of 60 adolescent respondents, 48 early adolescents (or 80%) experienced dysmenorrhea during their first menstruation at the age of 10 to 13 years (early adolescence). Based on [table 2](#), it can be seen that out of 60 adolescent respondents who experienced dysmenorrhea, 29 adolescents (48.4%) reported experiencing mild pain.

Table 1 Frequency distribution of respondents based on menarche groups among adolescents at MTS and SMK Muhammadiyah Jogoroto

Menarche Age Group	Frequency	Percentage (%)
Childhood	0	0
Early Adolescence	48	80
Middle Adolescence	10	16.7
Late Adolescence	2	3.3
Total	60	100

Table 2 Frequency distribution of respondents based on the degree of dysmenorrhea pain among adolescents at MTS and SMK Muhammadiyah Jogoroto

Degree of Dysmenorrhea	Frequency	Percentage (%)
Mild Pain	29	48.4
Moderate Pain	17	28.3
Severe Pain	14	23.3
Total	60	100

Table 3 Frequency Distribution of Respondents Based on the Dysmenorrhea Severity Among Adolescents at MTS and SMK Muhammadiyah Jogoroto

Dysmenorrhea Severity	Frequency	Percentage (%)
No Dysmenorrhea	2	3.3
Mild Dysmenorrhea	44	73.4
Moderate Dysmenorrhea	11	18.3
Severe Dysmenorrhea	3	5
Total	60	100

Table 4 Distribution of dysmenorrhea before and after the dysmenorrhea exercise intervention among adolescent respondents at MTS and SMK Muhammadiyah Jogoroto

Variabel	N	Mean rank	p-value
Dysmenorrhea Severity (pre)	60	21.52	0.0001
Dysmenorrhea Severity (post)		23.24	

Based on [table 3](#), it can be seen that out of 60 adolescent respondents who experienced dysmenorrhea, 44 adolescents (73.3%) reported experiencing mild dysmenorrhea. Based on the results presented in [table 4](#), the mean rank of respondents before the dysmenorrhea exercise intervention was 21.52, while the mean rank after the exercise was 23.24. Statistical analysis revealed a significant difference in the severity of dysmenorrhea before and after the intervention, with a *p*-value of 0.0001, which is less than α (0.05).

DISCUSSION

Research findings indicate a significant difference in pain reduction among adolescent girls following dysmenorrhea exercise interventions. Statistical analyses support that various studies have demonstrated the effectiveness of therapeutic exercise and physical activity in alleviating pain. Exercise is believed to delay the initial accumulation of prostaglandins and enhance the elimination of metabolic waste from the body. This, in turn, reduces menstrual pain by increasing endorphin levels, lowering stress, and decreasing sympathetic nervous activity, while also improving pelvic blood flow (Yeknami et al., 2015).

Pain reduction occurs due to the facilitated release of prostaglandins following physical activity. Moreover, exercise enhances uterine blood flow and metabolism. Other effects include a reduction in dysmenorrhea and the release of antidiuretic hormones during physical activity, as well as vasoconstriction in the pelvic region, which contributes to the breakdown of prostaglandins. Multiple studies have reported that exercise therapy and physical activity are associated with

decreased dysmenorrhea. Exercise therapy has been shown to improve pelvic blood flow prior to menstruation, thereby delaying the onset of pain.

During menstruation, exercise facilitates the faster removal of prostaglandins and waste products from the uterus—prostaglandins being the primary cause of menstrual pain. Regular physical activity also plays a crucial role in stress management, enhancing blood circulation, boosting endorphin levels, and improving neural transduction. Stress inhibition is one of the key mechanisms underlying the relationship between exercise and menstrual health (Wahyuni et al., 2021).

One study utilized non-steroidal anti-inflammatory drugs (NSAIDs) to alleviate dysmenorrhea symptoms. NSAIDs function by inhibiting the conversion of arachidonic acid into endoperoxides via cyclooxygenase (COX), thereby suppressing the production and release of prostaglandins, which ultimately leads to pain reduction. However, long-term use of NSAIDs may cause various side effects, including headache, dizziness, drowsiness, loss of appetite, nausea, vomiting, gastrointestinal bleeding, acute asthma, dysuria, and acne. Individuals with gastrointestinal issues are advised to take these medications under specialist supervision. Daniels et al. (2009) concluded that celecoxib exhibits analgesic effects, with COX-2 inhibition playing a crucial role in neutralizing menstrual pain. Likewise, COX-2 has been identified as a significant target in the management of dysmenorrhea. Iacovides et al. (2014) further supported the efficacy of NSAIDs in the treatment of dysmenorrhea.

Among the recommended non-pharmacological interventions, dysmenorrhea exercise intervention (or menstrual gymnastics) has been suggested as an effective relaxation technique. Its primary aim is to reduce the intensity and frequency of dysmenorrhea experienced by many women each month (Suparto, 2011). This is largely attributed to the increased production of endorphins during physical activity. These hormones, produced by the brain and spinal cord, act as natural painkillers, promoting a sense of well-being (Haruyama, 2011).

The more frequent the exercise, the higher the β -endorphin levels. These β -endorphins are released and bind to receptors in the hypothalamus and limbic system, which are responsible for regulating emotional responses. Elevated levels of β -endorphins have been shown to significantly reduce pain and are associated with enhanced memory, appetite, sexual function, blood pressure regulation, and respiratory function. Therefore, aerobic exercise is considered one of the most effective non-pharmacological approaches for alleviating pain, particularly in managing dysmenorrhea (Abbaspour et al., 2006).

CONCLUSION

Based on the research findings, it can be concluded that dysmenorrhea exercise intervention has a positive effect in reducing menstrual pain among adolescent girls. This form of physical activity helps improve blood circulation, correct muscle imbalances, and stimulate the release of endorphins—all of which contribute to alleviating menstrual discomfort. Therefore, dysmenorrhea exercise intervention can be considered an effective non-pharmacological therapy for reducing the discomfort experienced by adolescent girls during their menstrual periods.

Acknowledgment

The author gratefully acknowledges the general support and collaboration provided by STIKES Husada Jombang and MTS SMK Muhammadiyah Jogoroto in the conduct of this scientific research.

Ethical Approval

Ethical approval was not required.

Funding

This research received no external funding

Author Contributions

Conceptualization: E.K. Methodology: E.K. Data Collection: E.K. Data Analysis: E.K. Writing – Original Draft: E.K. Writing – Review & Editing: E.K., P.S.

Extracting and managing data: P.S. All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

The authors declare no conflicts of interest.

Abbreviations

NSAID	Nonsteroidal Anti-inflammatory Drugs
COX	Cyclooxygenase
MTS	Islamic Junior High School
PGE2	Prostaglandin E2
PGF2 α	Prostaglandin F2 α
SMK	Vocational High School

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